



United States  
Department Of  
Agriculture

Forest  
Service

Shasta-Trinity National Forest  
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Subject: Evaluation of Red Fir Stands Near Sand Flat, Mt. Shasta RD,  
Shasta-Trinity NF (Rept. No. N89-14).

To: Forest Supervisor, Shasta-Trinity NF

Recurring mortality and salvage activity near dispersed recreation areas on Mt. Shasta have caused some concern. Small Sales Forester Paul Finke requested an evaluation of the areas. The areas were examined on June 28, 1989 by Dave Schultz and Gregg DeNitto from the Forest Pest Management Northern Service area, Dave Trevisan, District Timber Management Officer, and Paul Finke.

Red Fir Flat, Sand Flat and Bunny Flat are along the Everitt Memorial Highway at elevations of 6,500 to 7,000 feet. This area is subject to heavy dispersed recreation use because of easy access and the proximity to trailheads into Mt. Shasta Wilderness. The gentle terrain and easy access have also resulted in considerable off-highway traffic, both by recreationists and fuelwood cutters. Standing and fallen dead trees are usually removed rapidly in this area by fuelwood gatherers.

These areas have an overstory which is predominantly or exclusively overmature red fir. The stands are rather open in many areas, but the large size of the overstory trees makes the basal area high in some places. Most aggregations have either no understory or scattered individual smaller size class fir trees. Dense clumps of sapling and pole-size red fir are present in a few spots.

Diseases are having little impact on trees in the area. There is a slow attrition of the overstory trees due to winter storm breakage and beetle attacks. Fir engraver beetles, Scolytus ventralis, are able to kill some trees every year because there is an ample supply of very old trees which are subject to the stress of occasional dry years and stocking which is high in some clumps. Intensive recreational use of some areas may have a slight impact on tree health, although the outward appearance of trees in heavily used areas was similar to trees in less disturbed areas.

For the most part, the stand is experiencing a slow decline of an overmature, climax forest. Under natural conditions, the opening and warming of the stand combined with the buildup of dead fuel would create conditions conducive to a wildfire that would help regenerate the stand. Little fuel is currently building up in the area because dead trees are removed by a salvage program and through fuelwood cutting.

One of the management alternatives being considered by the District is to identify the trees which have a high probability of dying over the next five year period so they can be removed in a single salvage operation. A single entry would be more efficient than multiple entries and would also generally



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result in less wounding of residual trees and less soil disturbance. The best available method of identifying true fir trees which have a high probability of dying is the use of an Award-Penalty Risk System described in General Technical Report PSW-39; Risk-Rating Systems for Mature Red Fir and White Fir in Northern California.

The Rating System does not predict the probability of an individual tree dying, but rather the percentage of a population of identical trees that would be expected to die within five years. Generally, the types of red fir trees the Rating System would identify as having a high probability of dying have had the top and/or enough branches die to produce a very ragged crown that contains less live foliage than the equivalent of a 10 percent live crown. The visual impression of one of these trees is a tree which is almost dead. Because the Risk System deals with probabilities, it is not 100 percent accurate. Use of the Risk System may remove a few trees that would otherwise live more than 5 years. It should also be expected that even if the System is rigorously applied, some additional trees will die during the following 5 year period.

In the areas examined, there are currently one to two trees per acre that would be identified as having a high probability of dying during the next five years. This is the equivalent of an annual mortality rate of 0.2 to 0.4 trees per acre per year. Based on some previous limited mortality surveys in the red fir type, this rate of loss would be considered average to moderate for years with normal precipitation and low for years with below normal precipitation.

If the current rate of mortality remained constant, the overstory would survive several hundred more years. It is more likely, however, that as the stands age and slowly open up, the rate of mortality will increase. There are probably some opportunities to take advantage of small openings created by salvage logging to initiate replacement trees. Scarification of the soil may be enough to cause some seed to germinate. Planting seedlings would give more control over the process and may offer an opportunity to involve the public in a volunteer project. Vehicular and foot traffic control may be needed to protect young seedlings.

#### Management Alternatives

1. Do nothing. This assumes the current practice of salvaging dead trees as needed would continue, but no extraordinary projects would be undertaken in the area. The removal of dead trees will have little or no effect on the beetle populations, health of the live trees, or future mortality in the area. Soil disturbance during salvage operations may cause some red fir seed to germinate, but subsequent operations may damage or kill the seedlings. There will be a slow attrition of the overstory red fir. Current conditions do not seem to favor the orderly development of a replacement stand in all areas.
2. Salvage trees likely to die in near future. Removal of certain declining trees prior to their attack by the fir engraver, Scolytus ventralis, may reduce the risk of attack on adjacent trees. Because a limited number of trees would be removed, and not all of these trees would be adjacent to another live tree, the benefit to the stand would be small. A few additional trees should be expected to die because the Rating System uses only the external appearance of the trees to assign the risk of mortality, and there are some other factors involved. The major benefit to the stand of identifying the trees likely to die





during the next 5 year period and removing them in a single operation would be to reduce the total amount of soil and stand disturbance. Tree mortality would return to the previous rate following a five year time span and conditions would be very similar to the Do nothing alternative.

3. Promote healthy future stands. The existing overstory and understory both tend to have a somewhat clumped distribution. Although both the overstory and understory are quite sparse in many areas, there are also areas where the stocking is dense for a stand managed for recreation on a very long rotation. These limited areas with dense stocking would be more likely to develop into long-lived, thrifty stands if it were possible to do some light thinning of the suppressed and intermediate individuals. Some form of artificial regeneration will probably be needed to insure the long-term perpetuation of red fir stands in the area. Because of high useage of the area, large planted seedlings may have a greater chance of survival than seedlings which germinate from seed on the site. If planting is confined to existing openings, or those created by salvage logging, it should result in a mosaic of tree ages and sizes which would resemble some natural stands. Control of pocket gophers may be necessary to insure good survival of planted seedlings.

If you have any questions or need additional assistance, please call Dave Schultz or Gregg DeNitto at 916-246-5087.

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# SALVAGE

